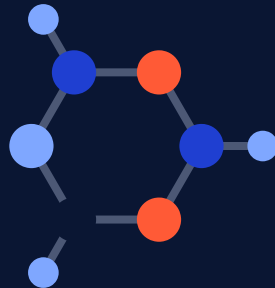


TECHNICAL SEMINAR

Machine Learning in Healthcare

How data is changing diagnosis and care

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Agenda

- 01** Overview
- 02** Core concepts
- 03** Applications
- 04** Challenges
- 05** Future

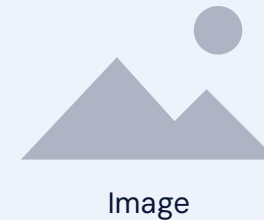


Image



Introduction

- Machine learning finds patterns in medical data
- It supports doctors in diagnosis and planning
- Used with scans, records and wearable data
- Needs careful validation and privacy safeguards





Evolution

1970s

Expert systems

Rule-based medical advice



2000s

Digital records

Data becomes available



2012

Deep learning

Breakthroughs in image tasks



2020s

Clinical tools

Approved AI-assisted devices



Key concepts

01

Supervised learning

Learning from labelled examples.

02

Computer vision

Reading X-rays and scans.

03

Predictive models

Estimating risk from records.



Architecture



Architecture diagram

Data pipelines, models and clinician review.

Models are trained on de-identified data, validated on separate populations and deployed as decision support, with clinicians always making the final call.



Applications



Image 1

Radiology

Flagging suspicious scans.



Image 2

Triage

Prioritising urgent cases.



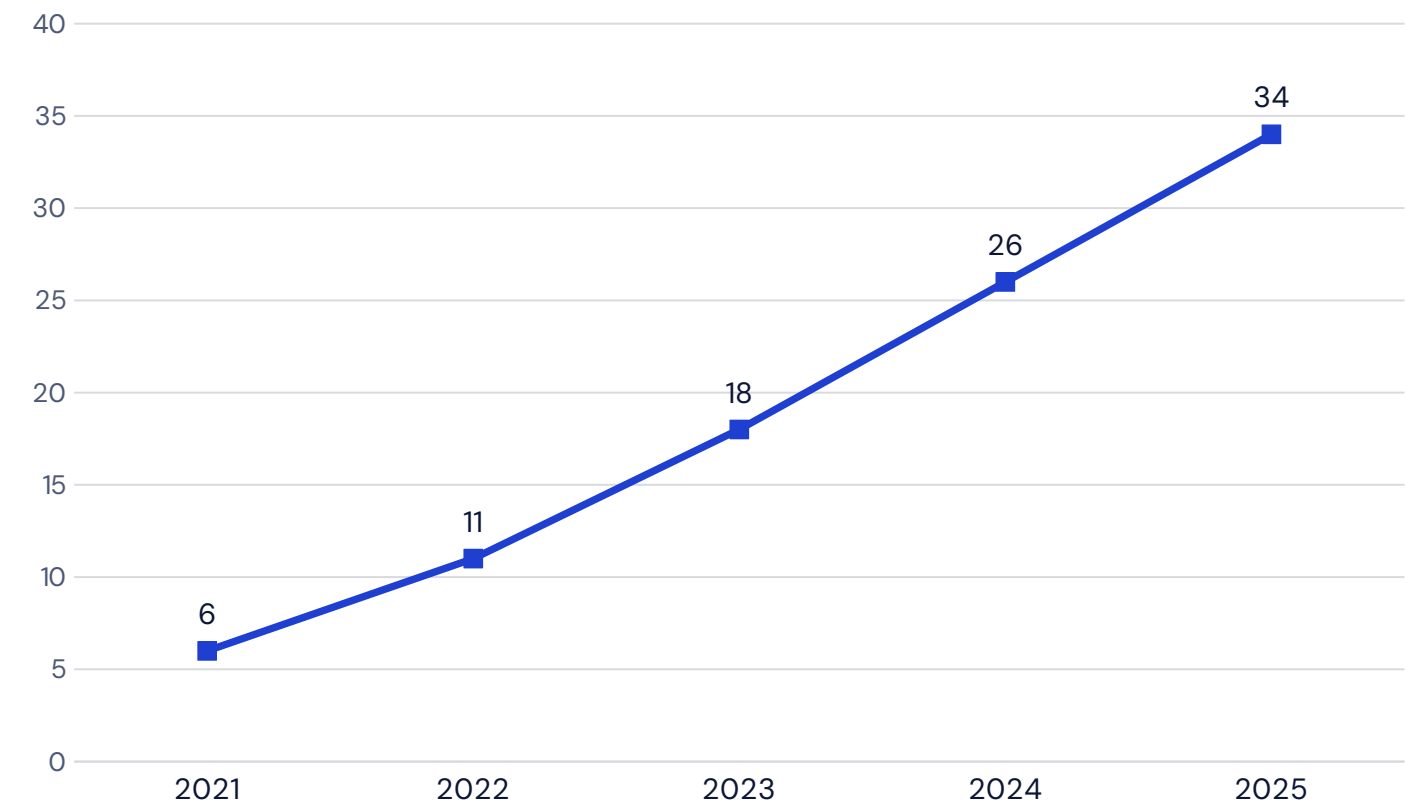
Image 3

Chronic care

Predicting complications early.



Adoption trend



Hospitals piloting AI tools
(sample data).

Sample data for illustration — replace with your own figures.



Advantages and limitations

Advantages

- Earlier detection
- Faster reporting
- Support where specialists are scarce
- Personalised care

vs

Limitations

- Bias in data
- Privacy risks
- Hard to explain decisions
- Regulatory hurdles



Open challenges

01

Data quality

Diverse, labelled data needed.

02

Trust

Explainability for clinicians.

03

Regulation

Approval and monitoring.

AI will act as a second pair of eyes for every clinician.



Conclusion

- ML can extend specialist expertise
- Validation and fairness are essential
- Humans stay in charge of care

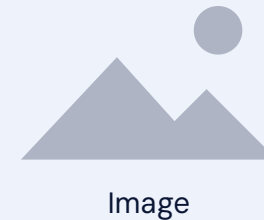


Image



References

- [1] Survey paper on the topic, IEEE Access, 2024.
- [2] Textbook chapter covering fundamentals, 2023.
- [3] Recent conference paper on applications, 2025.
- [4] Industry white paper (generic reference).



Questions?

Thank you for listening.